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No. VIII.

TWISTED-WIRE SPRING FOR CARRIAGES.

The Silver Isis Medal *was presented to M.* Victor De Stains, *for his Twisted-wire Spring for Carriages; a Model of which has been placed in the Society's Repository.*

30 *Half Moon Street, Piccadilly,*
Sir, 24*th February,* 1840.

I take the liberty to submit to the Members of the Society of Arts a spring of my invention, constructed on a principle entirely new, and applicable to carriages, or to any other mechanical purpose.

The advantages of this new spring upon other carriage-springs are the following:—

1. *Strength and Pliability.*—The wires, being stretched longitudinally, have no friction upon one another; they can easily be increased in thickness or in number to any strength required, and they may be tightened in a moment according to the occasional addition of weight that may be placed upon it.

Whilst the other springs in use, composed of numerous plates placed one above another, have a great deal of friction, and are thereby retarded in their immediate action, and produce, after a lapse of time, a most unpleasant noise; besides, they must be loaded up to a certain point, under which they are completely rigid.

2. *Weight of the Spring.*—The steel employed being used *in all its particles,* the weight of the spring is about $\frac{1}{300}$ of the weight suspended. Whilst the weight of the

springs in common use varies from $\frac{1}{10}$ to $\frac{1}{3}$ of the weight suspended; consequently, the wheels and the horses of a travelling carriage, supposed to weigh about ten cwt., would be relieved of two or three cwt.

3. *Facility of Repairs.*—The total weight of the springs necessary for a travelling carriage being three pounds, a change or two of springs may be easily packed in the box; and, in case of accident, ten minutes would be more than sufficient to replace the damaged spring. Whilst two days are oftentimes not sufficient to make a new spring; and, in most cases, when travelling in Italy, or other distant countries, the broken spring is mended with cords, anyhow, to allow the traveller to come to the next town, where even he very seldom meets with a mechanic that is able to repair the damage.

4. *Cheapness.*—The springs necessary for a carriage would not cost more than ten shillings, whereas they cost now from twelve to twenty pounds.

The steel wires composing the springs might be stretched upon certain parts of the train to which they would give additional firmness and strength. The only additional expense would be the revolving roller, but it would be dispensed with in any thing but a carriage, its use being for a peculiar purpose, viz.:—

5. *Safety.*—Both sides of the carriage being connected by the roller, no momentary shock, or increase of weight, will cause it to recline on either side, the vehicle will always remain *parallel with the level of the road whatever may be its velocity in turning;* whereas most coaches are overturned, because the weight being thrown entirely upon the outer spring, this one bends down beyond its elastic powers, whilst the inner one, being relieved, rises to its farthest extent and upsets the carriage.

Should any verbal explanation be thought necessary, I shall be happy to attend on the Members of the Society at any appointed time.

Expecting that you will do me the favour to present the accompanying little model to the Society of which you are Secretary,

I am, Sir, &c. &c.

W. A. Graham, Esq. V. De Stains.

Secretary, &c. &c,

The springs are placed one at each end of the carriage-frame in tube-casings of a length equal to the width of the carriage. Each spring consists of an endless steel-wire of four lengths, twisted together in opposite directions from the centre, and having a lever bar passed through at the centre, precisely after the manner of that of the stretching cord of the hand frame-saw. The spring has its bearing on two ratchet plates, which have holes round their centres, through which the single wires are passed, so that all the strands of the twist may be brought to an equal degree of tension. The ratchets are fitted with clicks, and serve for adjusting the springs to a degree of tension proportionate to the weight of the carriage. The resistance of the spring is transmitted, by jointed rods, from the spring-bar to a roller (parallel with the spring), which carries the bars from the ends of which the body of the carriage is suspended.

The principle of this spring is different from that of the French torsion-spring, the action of which depends on the resilient effort of a steel bar (fastened at one end) to relieve itself from the twist given to it at the free end by the weight of the carriage; whereas, the action of the twisted-wire spring depends on the resistance which it offers to a higher degree of tension between its bearings than that to which it is adjusted. M. de Stains does not restrict himself to the mode of suspending the carriage here described; the invention being offered to the public rather as a suggestive principle than as a recommendation of the form of its application represented by the model.

It is suggested that the lightness of the material and the facility with which it can be put together may recommend its adoption for heavy carriages, more especially in young colonies where there are not the ready means of manufacturing springs of the ordinary construction.

No. IX.

CRIB-BITING GUARD.

The Thanks of the Society were voted to EDWARD HORNOR, *Esq., Denham Park, for his Guard for Preventing Crib-biting in Horses; a Model of which has been placed in the Society's Repository.*

Denham Park,
27th May, 1839.

SIR,

HAVING lately invented a guard for the prevention of that most injurious practice of crib-biting (to which many horses are so addicted), and finding from several experienced persons that it is much more simple than any thing ever before constructed for the same purpose, at the same time that it answers infinitely better in every way, inasmuch as the prevention of cribbing is complete, whilst NO *difficulty is experienced by the horse in taking all his food in the ordinary way*,—which combination I am informed has never before been satisfactorily accom-